Neighborhoods.dr3.Aug 5 2002.doc August 5, 2002

Proposed Core Hypothesis/Question Justification
***Social Environment Working Group***
***Neighborhood And Community Influences***

I. Proposed Core Hypothesis/Question

Where one lives affects exposure to social, physical, psychological, and environmental factors that increase the risk of developing health problems, such as asthma, and decreased access to protective resources.

- Neighborhood and community characteristics that negatively influence the health of the mother during pregnancy – including poverty, poor housing quality, poor health care access, norms and policies that encourage smoking, and low levels of social interaction and support – increase the likelihood that the fetus will develop characteristics that predispose it to heightened susceptibility to health problems later in life.

- Neighborhood and community characteristics that contribute to environmental hazards– including poverty, poor housing quality, norms and policies that encourage smoking, low levels of political mobilization or collective efficacy, and high levels of crime and violence – increase the incidence and severity of childhood health problems, such as asthma, and complicate their management.

- Neighborhood and community characteristics that contribute to stress – including stressors such as poverty, unemployment, crime and violence, and poor housing quality, and the absence of stress-buffering resources such as social supports and access to health care and other institutions– increase the incidence and severity of childhood health problems, such as asthma, and complicate their management.

II. Workgroup: Social Environment

III. Contact persons for proposed core hypothesis/question

A. George Kaplan Phone: 734-764-5435 or 615-9209; Email gkaplan@umich.edu
B. Linda Burton (co-chair) – Office: 814.863.7108; Email: burton@pop.psu.edu
C. Christine Bachrach (co-chair) – Office: 301.496.9485; Email: cbachrach@nih.gov

IV. Public Health Significance.

Health outcomes for children vary systematically across geographic areas, including small areas such as local neighborhoods as well as broader communities such as cities, town, suburbs, and rural areas. For example:

- Among the 50 largest cities in the United States in 1991, infant mortality rates ranged from 5.3 per 1,000 births in Miami to 21.0 in Washington, D.C. and the percent of births to mothers who received late or no prenatal care in 1994 ranged from 2 in Honolulu to 15 in Washington DC. (Annie E. Casey Foundation, 1997).
- Eighteen U.S. cities participated in the Youth Risk Behavior Surveillance System in 2001. Among these cities, the proportion of high school youth who rarely or never wore seatbelts was 6.7 in Los Angeles and 38.2 in Milwaukee; the proportion who currently smoke cigarettes was 11.9 in New Orleans and 24.7 in Chicago (Centers for Disease Control and Protection, 2002).
- Cigarette smoking among adolescents 12-17 years of age is highest (18.9%) in rural counties without a city of 10,000 or more and lowest (11.0%) in central cities (Eberhardt et al, 2001).
- Asthma mortality and hospitalization vary significantly among large cities and among neighborhoods within cities. Within cities, asthma death rates are highest in areas with higher concentrations of poor people and minority residents (particularly African Americans)(Lang and Polansky, 1994; Carr et al, 1992). Asthma prevalence is low among Mexican American children in the Southwest and high among Puerto Rican children in the East (Institute of Medicine, 2002).

These patterns of variation are due only in part to the characteristics of the individuals and families who live in these areas; they are also attributable to systematic differences in environments. Neighborhoods and larger communities vary in their structure, in the economic and social resources available to their residents, and in the health-related economic and social processes that occur there. Moreover, health policies and efforts to improve child health typically are organized on a geographic basis, whether at the state, local, or neighborhood level. These efforts are both an important part of the health environments for children and also potentially vary in their effectiveness depending on the structure, resources, and processes within these areas.

**Neighborhood and Community Structure**. The structure of areas includes the relatively fixed physical, demographic, and economic characteristics of an area that affect the social environments in which children live. These characteristics vary in scope from very proximate conditions of the household dwelling to the surrounding neighborhood and the broader community, whether a metropolitan area or a rural region. The dwelling unit and immediate neighborhood environment define almost the entire surroundings to which very young children are exposed. For at least a subset of disadvantaged families, some research shows that they do not venture far from a small neighborhood in which their dwelling is located. For these populations, therefore, small neighborhoods may be key

environments that affect their health. Although young children and the poor often are confined to small areas in their daily life, they are nonetheless affected by conditions in larger community areas. For example, the economic health of a metropolitan community may affect child poverty rates. Examples of aspects of neighborhood and community structure include the quality of housing (e.g., age of structure, structural soundness, maintenance deficiencies, safety, space and crowding, privacy, affordability, tenure [own vs. rent]); neighborhood land use, population density; problem conditions (noise, odors, traffic, transportation routes, street conditions); demographic structure (race-ethnic composition, residential segregation by race and socioeconomic characteristics, residential stability, and age structure of the population).

**Neighborhood and Community Resources**. The resources of neighborhoods and communities include the economic, social, organization, and cultural assets that affect child health and welfare. These resources also vary both across small areas and larger communities. Examples of important resources include: average levels of family income; the quality of community organizations including schools, recreational facilities, commercial outlets, public services, and religious institutions; and employment opportunities.

**Neighborhood and Community Processes**. The structure and resources of neighborhoods and communities affect an array of social processes that affect health. These include criminal victimization and law enforcement; patterns of social interaction including helping behavior and exchange; the development; maintenance, and enforcement of social norms; social and political participation; and engagement in work.

As an illustration, geographic variation in asthma prevalence and severity may reflect a variety of neighborhood and community influences that affect maternal and child health over the course of development. During gestation, neighborhood and community factors that negatively influence the health of the mother may increase the likelihood that the fetus will develop characteristics that predispose it to heightened susceptibility to asthma later in life. For example, poor health of the mother may have an impact on small airway size and reactivity, and on immunologic response to environmental and psychosocial stimuli. Examples of neighborhood and community factors contributing to asthma susceptibility during the prenatal period include:

- neighborhood socioeconomic disadvantage;
- community norms, environmental restrictions, advertising, and other influences that promote or discourage maternal smoking and other health damaging behaviors;
- low levels of social network participation and support;
- low levels of political power and/or organization, related to exposure to outdoor pollutants (e.g., diesel exhaust, factory emissions);
- lack of convenient access to high-quality and affordable medical care;

- poor housing stocks, associated with increased maternal exposure to cockroach, mouse, mold, and dust mite antigens as well as poor ventilation and inadequate heating, use of gas stoves for heating, etc.; and
- high levels of infectious disease.

During childhood, community and neighborhood factors may contribute to an increased incidence and severity of asthma. Relevant factors include:

- neighborhood socioeconomic disadvantage;
- community norms, environmental restrictions, advertising, and other influences that promote or discourage smoking;
- low levels of social network participation and support, and lack of formal and informal social institutions focused on stress reduction;
- low levels of political power and/or organization, related to the ability to challenge and control exposure to indoor and outdoor pollutants (e.g., diesel exhaust, factory emissions);
- lack of convenient access to high-quality and affordable medical care (affecting severity at diagnosis via poorer screening and case-finding);
- poor housing stocks, associated with increased exposure to cockroach, mouse, mold, and dust mite antigens as well as poor ventilation and inadequate heating, use of gas stoves for heating, etc.; and
- community disorganization, crime, and violence, increasing stress and promoting behaviors and coping strategies that increase the incidence of asthma (e.g., keeping children inside).

Finally, neighborhood and community factors may be associated with poorer management of asthma and greater asthmatic complications. Relevant factors include:

- neighborhood socioeconomic disadvantage;
- low levels of community investment in resources devoted to children;
- community norms, environmental restrictions, advertising, and other influences that promote or discourage smoking;
- low levels of social network participation and support, and lack of formal and informal social institutions focused on stress reduction;
- low levels of political power and/or organization, related to the ability to challenge and control exposure to indoor and outdoor pollutants (e.g., diesel exhaust, factory emissions);
- lack of convenient access to high-quality and affordable medical care (affecting severity at diagnosis via poorer screening and case-finding);
- poor housing stocks, associated with increased exposure to cockroach, mouse, mold, and dust mite antigens as well as poor ventilation and inadequate heating, use of gas stoves for heating, etc.;
- community disorganization, crime, and violence, increasing stress and decreasing the likelihood of successful use of behavioral and stress management strategies for asthma control, and increasing coping strategies that decrease asthma control; and

- high levels of infectious disease.

V. Justification for a Large, Prospective, Longitudinal Study

While studies of the role of neighborhood and community factors in health problems of major public health significance are beginning to be carried out, most suffer from insufficient variation in neighborhood characteristics, and few produce estimates that are nationally representative. To adequately understand the intersection of socioeconomic, racial/ethnic, and neighborhood/community factors in the incidence, progression, and control of childhood asthma requires a large sample in which various relatively rare combinations of exposures – e.g. high income, African-American, highly integrated communities – are included. Otherwise it is impossible to distinguish between the effects of socioeconomic, race/ethnicity, and community factors on asthma and complications of asthma.

Further, estimation of neighborhood and community effects requires the use of sampling strategies that select a large number of areal units that are diverse with regard to the key hypothesized determinants of outcomes, and sufficient cases within each area to permit estimation of multi-level models. Although specific power analyses are not attempted here, the broad range of outcomes to be addressed by the NCS and the hypothesized complexity of social environmental effects imply the need for large sample of areal units stratified by such factors as region, rurality, racial/ethnic composition, income levels, and indicators potentially related to social process in neighborhoods (e.g., crime rates, religious affiliation, family structure, female labor force participation, political affiliations).

Longitudinal studies are well-recognized as the most appropriate design for examining factors related to incidence and progression of disease. Variables such as exposure to antigens, family stress, neighborhood social process, and community norms cannot be measured retrospectively. These factors must be observed prospectively, and changes over time in these exposures must be measured along with changes in outcome.

Residential mobility is a critical problem in studies of neighborhoods and neighborhood effects. A prospective longitudinal study will be able to follow respondents over time and monitor residential mobility in order to assess residential change or mobility and the role it plays in health disparities by socioeconomic status, race, and geography.

VI. Scientific Merit

Considerable research has been conducted on the effects of neighborhoods on child and adolescent developmental outcomes. Most of this research has

focused on the early childhood period and the adolescent years, and greater focus has been placed on developmental and behavioral outcomes than on health outcomes per se (Leventhal and Brooks-Gunn, 2000). The great majority of research has been conducted in urban areas and almost all has been based on observational studies. Although the identification of neighborhood effects in such studies presents difficult problems of research design, this research typically finds small, significant effects of neighborhood structure and resources on these outcomes. One experimental study, the Moving to Opportunity (MTO) study, offered a random sample of families eligible for housing assistance the opportunity to move to more affluent neighborhoods. The study found that residence in such neighborhood improved both mental and physical health among mothers and reduced injuries, asthma attacks, and problem behaviors among children (Katz et al., 2001).

Two recent reviews (Burton and Jarrett, 2000; Leventhal and Brooks-Gunn, 2000) summarize the literature on the effects of neighborhood characteristics on developmental, health, and behavioral outcomes. Neighborhood socioeconomic status (e.g., measured in terms of income, unemployment, and percent of managerial and professional workers) has positive effects on school readiness, IQ, and achievement in early childhood and adolescence and on overall educational attainment. Low-SES neighborhoods have also been associated with externalizing (acting-out and aggressive) behaviors, and less consistently with internalizing (depressive and withdrawn) behaviors and with teen sexual activity and childbearing (Leventhal and Brooks-Gunn, 2000).

Neighborhood racial and ethnic diversity has been linked to lower levels of verbal ability in children but higher levels of educational attainment among male African American adolescents. The effects of racial and ethnic diversity on behavior problems appear to vary depending on the race of the child and the socioeconomic status of the neighborhood. Neighborhood residential instability (or turnover in the neighborhood's population) has been linked to higher rates of behavioral problems such as delinquency and crime, but one study found higher rates of alcohol use in more stable neighborhoods (Leventhal and Brooks-Gunn, 2000).

Many studies find that neighborhood effects are complex, often influencing some groups but not others, or influencing the relationships between other determinants and health outcomes. For example, research by O'Campo and her associates (1997) suggests that receiving prenatal care has less influence on birthweight among women living in high-risk neighborhoods than women living in low-risk neighborhoods. One study (Simons et al, 1996) linked community disadvantage to boys', but not girls', psychological distress and conduct disorders, while another (Kupersmidt et al., 1995) found that higher neighborhood socioeconomic status acted to reduce levels of childhood aggression among children from single-parent families.

Theoretical models for linking individual behaviors to neighborhood effects have been proposed by several scientists. Jencks and Mayer (1990) propose five alternative mechanisms: (1) neighborhood institutional resources, i.e., the availability of financial, social, and organizational resources that affect the ways in which a young person enters adulthood; (2) collective socialization, i.e., the transmission of attitudes and behaviors through role models, supervision, and monitoring and other aspects of community social organization; (3) contagion, i.e., the spread of norms, values, and behaviors among residents of neighborhoods; (4) competition among neighborhood residents for scarce community resources; and (5) relative deprivation, i.e., individuals' and families' assessment of their own well-being compared to the average economic level of the neighborhood. Leventhal and Brooks-Gunn (2000) suggest three complementary mechanisms: (1) availability of institutional resources (learning, health, recreation, etc.); (2) the mediating effects of parental relationships and support networks; and (3) the influence of community formal and informal institutions and norms that serve to guide and monitor behaviors.

In studies of child health and developmental outcomes, the role of the family in mediating and moderating neighborhood influences is crucial (Burton and Jarrett, 2000). Areas with few job opportunities would be expected to influence child outcomes through the effect of job scarcity on parental income, work, and stress. Also, areas that are high in crime may have differing effects on child outcomes depending on the parenting strategies parents adopt in relation to this environmental threat. Children may be affected minimally if they are closely supervised, but strongly if they are not.

Research on the mechanisms responsible for observed neighborhood effects is still in its infancy (Leventhal and Brooks-Gunn, 2000). The Project on Human Development in Chicago Neighborhoods has provided evidence that high levels of collective efficacy, defined as the extent to which neighborhood residents feel empowered to act together toward a common goal, can reduce rates of violent crime within neighborhoods (Sampson, et al., 1997). Many other studies have similarly explored specific effects related to neighborhood resources, structure, and process. However, the research base is still too limited to determine which pathways are most important.

Key questions about the impacts of neighborhoods and communities on child health remain unanswered. These include:

- To what degree do families affect the health of children through their choices of neighborhoods and communities in which they live? Valid estimation of neighborhood effects is hampered by the difficulty of controlling for selection effects, i.e., the tendency of healthier people to choose to live in healthier neighborhoods. The existence of selection effects depends on the

assumption that people choose where they live, yet range of choice is itself a function of social and economic resources. Addressing selection effects is a challenge in any observational study, but the ability to measure the causes and consequences of residential location over time in a large, diverse sample provides an unprecedented opportunity to model and account for these effects in studies of neighborhood effects.

- To what extent do the findings from MTO, which pertain only to public housing in Boston, generalize to the nation as a whole? What is the role of housing quality vs. housing location in influencing child health outcomes such as asthma?

- Which health outcomes are particularly responsive to variations in neighborhood and community structure, resources, and processes?

- To what extent is observed area variation in health outcomes explained by population composition on individual and family/household factors that are known to affect health?

- To the extent that neighborhoods and communities affect child health, what are the key mechanisms through which these effects occur? What is the relative importance of social processes, such as collective efficacy or social support, compared to neighborhood resources (access to grocery stores, health services, community wealth, community institutions) or physical exposures (traffic hazards, pollutants)?

- How are neighborhood effects mediated and moderated through family-level variables, including race/ethnicity, socioeconomic status, employment, parenting, and other aspects of family process and family relationships?

There are no studies of sufficient interdisciplinary complexity and size to estimate the impact of community and neighborhood factors on the incidence and complications of childhood health outcomes. Yet, numerous recent publications from NIH and the IOM and editorials in leading scientific journals have underscored the importance of considering these contextual factors (e.g., Singer and Ryff, 2001; Office of Behavioral and Social Sciences Research, 2001). Because of the need for large, representative, and prospective studies, and the consequent expense, it is unlikely that the importance of neighborhood and community factors can be adequately addressed in any study other than the proposed NCS.

VII. Potential for Innovative Research

The potential is high, as implicit in the unanswered questions detailed above. Attention to neighborhood and community factors in the NCS will substantially advance the multi-level approach to disease etiology and lead

to the development of standardized assessment tools that can be used in other studies and improve the scientific tools for addressing selection effects in observational studies of neighborhood effects. The interdisciplinary context of the proposed NCS means that there will be unparalleled opportunities to develop comprehensive tools for the assessment of community and neighborhood characteristics, and convincing answers to the role of neighborhood and community context in health outcomes such as childhood asthma.

VIII. Feasibility

A. Sampling needs

1. As noted above, the study sample must include areal units (e.g., an urban neighborhood or rural community) that are broadly representative of the United States and diverse with respect to race/ethnic composition, socioeconomic status, rural/suburban/urban location, region, proximity to health services, public policy environment, social characteristics, and physical environmental exposures.
2. Definition of the areal units to be sampled requires careful consideration. The unit (state, county, community, or local neighborhood) relevant to a particular research question will depending on the outcome and key hypothesized predictors. In most research on neighborhood effects, census tracts have been the units of analysis because of the availability of census data on census tract characteristics. For the same reason, census tracts and block groups should be a basic unit of sampling for the NCS.
3. However, census tracts may not adequately capture the geography of social identification with and social interaction within a local community or neighborhood. In selected communities, in-depth studies are recommended to provide richer data on the geographies of residents' everyday lives, the social dynamics of communities, cultural norms, and the impact of the policy environment.
4. Families (the focal child plus primary caretaker) must be tracked to new destinations and the circumstances prompting moves documented.
5. Sample size – as noted above, adequate samples within areal units are required for multi-level modeling of community effects.

B. Contact/assessment

Contacts with sample families/individuals are required during pregnancy and at moderate intervals (every two to three years) during childhood and adolescence, specific periodicity depending on outcome variable.

C. Nature of measurement

Considerable progress has been made in the development of techniques for assessing neighborhood and community characteristics, and many of these characteristics have been strongly associated with physical health, developmental, social outcomes, and psychological outcomes.

Much data on neighborhoods and communities can and should be obtained from independent, existing sources (e.g., records on local institutions,

businesses, government administrative records, and census data). Data from these sources can be linked based on GPS measurements of the geographic coordinates of the child's residence. A list of contextual measures employed in the National Longitudinal Study of Adolescent Health is available upon request as an illustration of the range of measures available. When available, most measures should be obtained for the smallest possible areal units (usually block groups or census tracts) although obtaining measures at the county and state levels requires little additional effort and may be appropriate in some cases.

Some measures must be collected from families, and some are best adapted to direct observation of neighborhoods. In the list below, items that require data collection from participating families are marked with a single asterisk. Those that may require direct observation are marked with two asterisks.

Measures needed:

*Measures of neighborhood structure:*

- Housing quality (age of structures, structural soundness**, maintenance deficiencies**, safety**, space and crowding, privacy, affordability, tenure [own vs. rent])
- Economic structure (percent of jobs in service, manufacturing sectors, etc.)
- Neighborhood land use
- Population density
- Transportation systems (availability of public transportation, street conditions**, traffic**)
- Problem conditions (safety hazards, noise, odors, pollution)**
- Demographic structure (race-ethnic composition, % foreign-born, residential segregation by race and socioeconomic characteristics, residential stability, marital status and age structure of the population).

*Measures of neighborhood resources:*

- Socioeconomic status (education, income, occupation of neighborhood residents)
- Health status of population (presence of infectious agents, % disabled)
- Presence and quality of community organizations including health services, schools, recreational facilities, commercial outlets, public services, and religious institutions
- Employment opportunities
- Social capital, collective efficacy*
- Shared norms (for behavior, upkeep of housing, parenting)*
- Policies (e.g., laws and resources directed toward tobacco control, welfare program requirements and provisions, Medicaid eligibility and provisions – see Social Policy hypothesis)

*Measures of neighborhood processes:*

- Crime and law enforcement (*administrative records and family perceptions)
- Patterns of social interaction including helping behavior, exchange of goods, services, ideas, and information, monitoring of behaviors in public spaces, and informal sanctioning of undesired or non-normative behavior*
- Participation in religious organizations and voluntary associations; political participation, voting (* administrative records and family reports)

*Other:*

- A residence history (childhood to the time of the focal pregnancy) should be collected from the primary caretaker(s) prior to the focal child's birth.
- GPS location for residence, key institutions (child care provider, schools, place of work).

*Intensive sites:*
Independent community surveys or ethnographies measuring community social process, geographies (locations and residents' day to day use of institutions, parks, grocery stores, factories). Systematic social observation (Sampson and Raudenbush, 1999) of neighborhood spaces to observed physical (e.g., graffiti, broken windows) and social (e.g., drug-dealing, loitering) disorder.

D. Burden on participants and families:
As noted above, a substantial proportion of the required measures can be obtained from existing sources. Some measures will add to respondent burden.

E. Ethical considerations, if any:
General issues include the need to protect the privacy of individuals and communities. Samples that concentrate research participants within neighborhoods can create increased challenges to maintaining confidentiality. These challenges can be addressed by appropriate procedures in the dissemination of data for secondary analysis (e.g., required security procedures for the handling of data; contractual arrangements with data users; redaction of data to reduce the potential for re-identification of case records).

Attention must be paid to the potential of research for stigmatizing communities. Community consultation and involvement cannot necessarily reduce this potential, but can help to ensure that appropriate measures relevant to the local community are included in the study and that community residents are empowered to understand and address any problems revealed by the research.

IX. References

Annie E. Casey Foundation. *City Kids Count: Data on the Well-Being of Children in Large Cities.* Baltimore, MD: Annie E. Casey Foundation, 1997.

Burton LM, Jarrett R. In the mix, yet on the margins: The place of families in urban neighborhood and child development research. *Journal of Marriage and the Family.* 2000; 62:1114-1135.

Carr W, Zeitel L, Weiss K. "Variations in Asthma Hospitalizations and Deaths in New York City." *AJPH,* 1992; 82:59-65.

Centers for Disease Control and Protection. Youth Risk Behavior Surveillance – United States, 2001.. *MMWR.* 2002; 51(No. SS-4).

Eberhardt MS, Ingram DD, Makuc DM, et al. Urban and Rural Health Chartbook. Health United States, 2001. Hyattsville MD: National Center for Health Statistics, 2001.

Jencks C, Mayer S. The social consequences of growing up in a poor neighborhood. Pp. 111-186 in Lynn LE, McGeary MFH (Eds.), *Inner-city Poverty in the United States.* Washington, D.C.: National Academy Press.

Katz LF, Kling JR, Liebman JB. Moving to Opportunity in Boston: Early results of a randomized mobility experiment. *Quarterly J. Economics.* 2001; 116: 607-654.

Kupersmidt JB, Griesler PC, Derosier ME, Et Al. Childhood aggression and peer relations in the context of family and neighborhood factors. *Child Dev* 1995; 66 (2): 360-375.

Lang DM, Polansky M. "Patterns of Asthma Mortality in Philadelphia from 1969 to 1991." *NEJM*, 1994; 331: 1542-1546.

Leventhal T, Brooks-Gunn, J. The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. *Psychological Bulletin.* 2000; 126: 309-337.

Institute of Medicine. *Clearing the Air: Asthma and Indoor Air Exposures*. Washington DC: National Academy Press, 2002.

O'Campo P, Xue X, Wang MC, Caughy M. Neighborhood risk factors for low birthweight in Baltimore: a multilevel analysis. *Am J Public Health* 1997; 87: 1113-1118.

Office of Behavioral and Social Sciences Research, National Institutes of Health. *Toward Higher Levels of Analysis: Progress and Promise in Research on Social and Cultural*

*Dimensions of Health, June 27-28, 2000*. Bethesda, Maryland: NIH Publication No. 01-5020, September 2001.

Sampson RJ, Raudenbush SW, Earls F. Neighborhoods and violent crime: A multilevel study of collective efficacy. *Science.* 1997; 277:918-924.

Sampson RJ, Raudenbush SW. Systematic social observation of public spaces: A new look at disorder in urban neighborhoods. *American Journal of Sociology* 1999; 105: 603-651.

Simons RL, Johnson C, Beaman J, et al. Parents and peer group as mediators of the effect of community structure on adolescent problem behavior. *Am J Commun Psychol* 1996; 24 (1): 145-171.

Singer B, Ryff C (eds.). *New Horizons in Health: An Integrative Approach*. Washington DC: National Academy Press, 2001.